

Student Learning Outcomes

ENGG-2009

Five College Learning Outcomes:

1. Written, Oral and Visual Communication: *Communicate effectively in writing, orally and/or visually using traditional and/or modern information resources and supporting technology.*

2. Scientific and Quantitative Reasoning: *Locate, identify, collect, and organize data in order to then analyze, interpret or evaluate it using mathematical skills and/or the scientific method.*

3. Critical Thinking: *Differentiate between facts, influences, opinions, and assumptions to reach reasoned and supportable conclusions.*

4. Problem Solving: *Recognize and identify the components of a problem or issue, look at it from multiple perspectives and investigate ways to resolve it.*

5. Information Literacy: *Formulate strategies to locate, evaluate and apply information from a variety of sources - print and/or electronic.*

I. Degrees and Certificates

1. What degrees and certificates does your discipline offer?

Engineering Major for AS Degree

2. Keeping in mind the five College Learning Outcomes above as well as what your discipline specifically requires of your graduating students, what should students be able to do when they have completed your discipline's requirements for each degree or certificate?

Upon completion of the A.S. Engineering Major, students will be able to:

- A. apply their knowledge of math, science, and engineering to identify, formulate, and solve engineering problems.
- B. design and perform experiments, as well as to analyze and interpret data.
- C. design a system, component, or process to meet desired needs.
- D. demonstrate professional ethical responsibility.
- E. communicate effectively and perform on multi-disciplinary teams.
- F. judge the effects of engineering projects on society and the environment.
- G. engage in life-long learning and explain contemporary issues.
- H. use the techniques, skills, and modern engineering tools necessary for engineering practice.

3. How do students in your program demonstrate that they meet each of the college-wide learning outcomes? What courses, activities, and/or projects are students required to complete that relate to each outcome?

i. Written, Oral and Visual Communication

All ENGG courses address communication skills to varying extents and in varying ways.

Written communication:

- a. Written research, project, and laboratory reports (110, 111, 150, 220L, 235, 245)
- b. Problem solutions on homework assignments and exams (all courses)

Oral communication:

- a. Oral presentations (110, 125)
- b. In-class discussions (110)
- c. Team projects/lab experiments (110B, 125, 150, 220L, 235, 245)

Visual communication

- a. Diagrammatic problem-solving (all courses)
- b. Creation and interpretation of graphs (all courses)

ii. Scientific and Quantitative Reasoning

All ENGG courses address scientific and quantitative reasoning extensively throughout most assignments and exams. Experimental data collection and analysis skills are particularly addressed in lab courses such as 110B, 220L, and 245.

iii. Critical Thinking

All ENGG courses address critical thinking skills to some extent in most assignments and exams.

- a. For every analytical problem, students must judge the most appropriate solution technique for a particular problem, identify relevant data, formulate and defend simplifying assumptions, and evaluate the reasonableness of results.
- b. For all design-oriented problems, students must evaluate the relative merit of competing design choices to satisfy multiple performance requirements and objectives, in order to finally arrive at a non-unique, but defensible 'best design' solution. Design skills are emphasized in 110B, 150, and 245.
- c. Critical thinking skills are also addressed through discussions and assignments involving social aspects of engineering, including professional ethics and the interaction of engineering with society and the environment. These topics are primarily addressed in 110A, but to a lesser extent in other courses.

iv. Problem Solving

Virtually all assignments and exams in all ENGG courses address problem solving skills.

v. Information Literacy

All ENGG courses require students to collect information from a variety of sources for use in problem solving and design. The types of sources include textbooks, handouts, data tables and graphs, reference handbooks, and internet sources.

II. General Education:

1. Does your discipline offer any classes which count for general education requirements?

2. Which General Education courses in your discipline address the each of the five College Learning Outcomes? Please list courses for each of the following:

i. Written, Oral and Visual Communication

ii. Scientific and Quantitative Reasoning

iii. Critical Thinking

iv. Problem Solving

v. Information Literacy

III. Course Level Outcomes:

1. Do all of your Course Outlines of Record include Student Learning Outcomes? If not, are you revising them?

Yes, all current ENGG COR's include SLO's.

2. What percentage of faculty members in your discipline include SLOs in their course syllabi?

100% (1 of 1)

3. Assessment:

i. How often do you assess these SLOs?

SLO's are implicitly assessed for individual students in each course every semester, since they form the basis for each student's grade in the course.

Explicit assessment of aggregate measures of SLO's will begin this year; however, since each course is only offered once per year (at best), and most ENGG courses have enrollments of under 10, it may be many years before any statistically meaningful conclusions can be drawn.

3. Assessment:

ii. In the last two years every discipline developed SLOs specifically related to College Learning Outcome #3: Critical Thinking. Have you assessed this or any of the stated Student Learning Outcomes in your course outlines over the last year? If so, please summarize the results.

No

3. Assessment:

iii. What improvements have you made or do you plan to make in the future?

Regarding SLO's, primary improvements thus far have been to include course-level SLO's in each course outline, and to link them to program-level and college-level SLO's. Additionally, the course-level SLO's are now included in all course syllabi.

3. Assessment:

iv. What do you plan to assess this year? Who will you assess? How will you assess?

This semester, I will assess the only ENGG course offered--ENGG 245 Materials Science. All students in the course will be assessed. SLO's will be assessed using Final Exam questions and several laboratory reports.

For the Fall semester, ENGG 235 Statics will be assessed.